LONDON-WEST MIDLANDS ENVIRONMENTAL STATEMENT

Volume 5 | Technical Appendices

CFA10 | Dunsmore, Wendover and Halton

Operational assessment (SV-004-010)

Sound, noise and vibration

November 2013

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Department for Transport

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Appendix SV-004-010

Environmental topic:	Sound, noise and vibration	SV
Appendix name:	Operation assessment	004
Community forum area:	Dunsmore, Wendover & Halton	010

Contents

List of tables

1 Introduction

1.1 Structure of the sound, noise and vibration appendices

1.1.1 The sound, noise and vibration appendices comprise four sections. The first of these details the methodology used (Appendix SV-001-000) and relates to the sound, noise and vibration assessment for all community forum areas (CFA).

1.1.2 For the Dunsmore, Wendover & Halton community forum area (CFA10), the other three sections are as follows:

- baseline sound, noise and vibration (Appendix SV-002-010);
- construction sound, noise and vibration (Appendix SV-003-010); and
- operational sound, noise and vibration (Appendix SV-004-010) (this appendix).

1.1.3 The outcomes of this assessment are summarised in Volume 2: CFA10Report, Chapter 11 Sound, Noise and Vibration.

1.1.4 Maps referred to throughout the sound, noise and vibration appendices are contained in the Volume 5 sound, noise and vibration map book.

1.1.5 This appendix presents the likely noise and vibration impacts, effects and significant effects arising from the operation of the Proposed Scheme for the Dunsmore, Wendover & Halton area on:

- people, primarily where they live ('residential receptors') in terms a) individual dwellings and b) on a wider community basis, including any shared community spaces; and
- community facilities such as schools, hospitals, places of worship, and also commercial properties such as offices and hotels, collectively described as 'non-residential receptors' and 'quiet areas'.

1.1.6 The assessment of likely impacts, effects and significant effects from operational noise and vibration on agricultural, community, ecological or heritage receptors and the assessment of tranquillity are presented in the following documents within Volume 5:

- Agriculture, forestry and soils — Appendix AG-001-010
- Community — Appendix CM-001-010
- Ecology — Appendix EC-005-002
- Heritage — Appendix CH-003-010
- Landscape and Visual — Appendix LV-001-010

1.2 Evaluation of impacts and effects

1.2.1 This appendix provides a quantitative assessment of operational noise and vibration impacts and effects and a qualitative assessment of likely significant effects, based on the impacts and effects identified and other local context information consistent with the scope and methodology defined for the Proposed Scheme.

1.2.2 Indirect effects arising from permanent changes in traffic patterns on the existing road and rail networks as a consequence of the Proposed Scheme are also reported in this appendix, where they would occur within the study area as defined in Volume 5: Appendix SV-001-000.

1.2.3 Route-wide impacts, effects and significant effects associated with noise or vibration from the operation of the Proposed Scheme are reported in Volume 3.

1.2.4 Off-route effects of noise or vibration arising from the operation of the Proposed Scheme, including those likely to arise from permanent changes in traffic patterns on roads or railways outside of the study area for direct effects are reported in Volume 4.

1.2.5 In undertaking the assessment of sound, noise and vibration, consistent with EIA Regulations and emerging National Planning Practice Guidance[1] a differentiation between impacts effects, adverse effects and significant effects is made. Further information is provided in Volume 5: Appendix SV001-000.

1.2.6 The assessment of impacts has been undertaken at assessment locations that are representative of a number of dwellings or other sensitive receptors. The Assessment Locations employed in this assessment are presented on map series Sv-02 in the CFA10 Volume 5 sound, noise and vibration map book.

[1] National Planning Practice Guidance – Noise http://planningguidance.planningportal.gov.uk ; refer to the table summarising noise exposure hierarchy

2 Scope, assumptions and limitations

2.1 Regional and local policy guidance

2.1.1 The policy framework for sound, noise and vibration is set out in Volume 1 and in Appendix SV-001-000. As part of the engagement with local authorities through the Planning Forum Sub Group (Acoustics), information regarding any specific local planning guidance in respect of noise and vibration has been requested. Whilst no information has been received for this study area via the Planning Forum Sub Group (Acoustics), the following local policy guidance on noise and vibration has been identified:

- Aylesbury Vale District Local Plan - Jan 2004 ;
- Wycombe Local Plan - Jan 2004; and
- The Local Plan for Chiltern District - Sept 1997.

2.1.2 This guidance has been considered as part of formulating the detailed application of the impact and significance criteria set out in Volume 5: Appendix SV-001-000.

2.2 Engagement

2.2.1 Details of engagement on a route-wide basis with the local and county authorities' Environmental Health Practitioners via the Planning Forum Sub Group - Acoustics, is set out in Volume 1, Section 8.

2.2.2 Engagement with communities has been via the Community Forums, as set out in Volume 1. In respect of sound, noise and vibration the following discussions have taken place:

- general discussions in respect of local issues, including possible ways to avoid and mitigate the potential impacts of noise or vibration
- September / October 2012; a specific presentation about sound, noise and vibration with discussion afterwards with one of the project team specialists;
- November / December 2012; specific request for the Community Forum to propose baseline sound monitoring locations;
- January / February 2013; feedback to the Community Forum on any proposed baseline monitoring locations; and
- verbal / written response to questions on sound, noise and vibration.

2.3 Methodology

2.3.1 The methodology used for the assessment of airborne sound, ground-borne sound and vibration impacts and the determination of significant effects is defined in the Scope and Methodology Report (SMR) (Volume 5: Appendix CT-001-000/1), is clarified in a number of areas by the SMR addendum (Volume 5: Appendix CT-001-000/2). Further information is contained in Volume 5: Appendix SV-001-000.

2.4 Assumptions

2.4.1 Route-wide assumptions are outlined in Volume 1, Section 8, and are further detailed in Volume 5: Appendix SV-001-000. Local assumptions that apply to the assessment of operational sound noise and vibration within this CFA are set out in Volume 2: Report 10 and below.

Maintenance Loops

2.4.2 As part of the Proposed Scheme, there will be the provision of two sets of maintenance loops. These will be constructed near Stoke Mandeville. These maintenance loops will consist of an additional section of track each side of the operational railway which will be provided to ensure the operational efficiency of the railway. The maintenance loops are shown on map series SV-02 in the CFA10 Volume 5 sound, noise and vibration map book.

2.4.3 These maintenance loops are primarily provided for the daytime storage of track machines that cannot return to Calvert IMD for operational reasons, but could also be used for the temporary storage of HS2 trains that are required to be removed from operational service.

2.4.4 The use of these maintenance loops will be infrequent and the activities most likely to be carried out on these loops will be occasional cleaning and preparation of track machines during the day. It is not expected that these maintenance loops will be in regular operational use and the majority of the servicing of track machines will be carried out at Calvert IMD which is located in study area CFA 13 where more appropriate facilities are proposed to be constructed. As such, due to their infrequent use, it is not expected that the maintenance loops will lead to any significant operational noise impacts.

2.5 Local limitations

2.5.1 In this area, there are a number of locations where the land or property owners did not permit baseline sound level monitoring to be undertaken at their premises. However, sufficient information has been obtained to undertake the assessment. Further information is provided in Volume 5: Appendix SV-002-010.

3 Environmental baseline

3.1 Existing baseline

3.1.1 Baseline sound level data has been collected at locations representative of the airborne sound-sensitive receptors. The existing and future baseline airborne sound levels derived from these measurements are included within Table 3. Details of the baseline data collection and the methodology are given in Volume 5: Appendix SV-001-000 and specifically for this study area in Volume 5: Appendix SV-002-010.

3.1.2 The majority of receptors adjacent to the line of the route are not currently subject to appreciable vibration and therefore vibration at all receptors has been assessed using the absolute vibration criteria as described in Volume 5: Appendix SV-001-000.

3.2 Future baseline

3.2.1 The assessment is based upon the predicted change in sound levels that result from the Proposed Scheme. The assessment initially considered a reasonable worst case (that would overestimate the change in levels) by assuming that sound levels would not change from the existing baseline year of 2012/2013. Where significant effects were identified on this basis, the effects have been assessed using the baseline year of 2026 to coincide with the proposed start of passenger services. The future baseline is for the sound environment that would exist in 2026 without the Proposed Scheme.

4 Effects arising during operation

4.1 Introduction

4.1.1 The assessment is reported first for ground-borne sound and vibration and then for airborne sound. Under each of these headings, the results of the quantitative identification of impacts and effects are presented. This is followed by the identification of significant effects and the evidence used to support these conclusions.

4.1.2 The structure of this assessment report is:

- Avoidance and mitigation measures
- Quantitative identification of impact and effects
  - Ground-borne sound and vibration
    - Residential
    - Non-residential
  - Airborne sound
    - Residential
    - Non-residential
- Assessment of impacts and effects
  - Residential receptors: direct effects – dwellings
  - Residential receptors: direct effects – communities
  - Residential receptors: indirect effects
  - Non-residential receptors: direct effects
  - Non-residential receptors: indirect effects
  - Cumulative effects from the proposed scheme and other committed development.

4.2 Avoidance and mitigation measures

4.2.1 These are set out in Volume 2: Report 10.

4.3 Quantitative identification of impacts and effects

Ground-borne sound and vibration

4.3.1 Assessment locations defined for the quantitative assessment of impacts are shown on map series SV-02 in the CFA10 Volume 5 sound, noise and vibration map book.

4.3.2 For each Assessment Location, the assessment results for residential and non-residential receptors are presented in Table 1. Explanation of the information in Table 1 is provided in Appendix SV-001-000, with the following additional notes.

B	For non-residential receptors further detail about the type of effect is set out in the text of Volume 5: Appendix SV-001-000.
NA	Type of effect - Generally no adverse effect
A	Type of effect - Adverse effect
S	Type of effect - Significant adverse effect
VDV	Vibration Dose Value
~	The forecast adverse effects are not considered to be significant on a community basis (further information on methodology is provided in Volume 5: Appendix SV-001-000).
^	The impact methodology has identified a potential significant effect at this receptor which based upon further qualitative information is not considered to be a likely significant effect. Please refer the end of this Appendix for further information.
	Where the significant effect column is highlighted in pink, then a significant effect is identified at the referenced residential community area, or individual receptor.
	Yellow denotes a low ground-borne noise impact or a minor ground-borne vibration impact
	Orange denotes a medium ground-borne noise impact or a moderate ground-borne vibration impact
	Red denotes a high ground-borne noise impact or a major ground-borne vibration impact
	Dark red denotes a very high ground-borne noise impact

Table 1: Ground-borne sound and vibration levels, noise and vibration impacts and effects

Assessment location		Impact criteria				Significance criteria								Significant effect
ID	Area represented	Ground-borne sound level dB L_{pASmax}	VDV $m/s^{1.75}$ Daytime (07:00 - 23:00)	VDV $m/s^{1.75}$ Night time (23:00 – 07:00)	% increase or decrease in VDV	Number of impacts represented	Type of effect	Type of receptor	Receptor design	Existing environment	Unique feature	Combined impact	Mitigation of effect	
359264	London Road, Wendover	-	0.10	0.05	-	2	NA	R	T	-	-	-	-	
359406	Bacombe Lane, Wendover	30.0	0.15	0.08	-	3	NA	R	T	-	-	-	-	
359570	Ellesborough Road, Wendover	30.0	0.15	0.07	-	6	NA	R	T	-	-	-	-	
368834	Rocky Lane, Wendover	-	0.16	0.08	-	1	NA	R	T	-	-	-	-	
711041	Ellesborough Road, Wendover	32.0	0.17	0.08	-	2	NA	R	T	-	-	-	-	
711042	Ellesborough Road, Wendover	28.0	0.11	0.06	-	6	NA	R	T	-	-	-	-	

Impact summary

4.3.3 The operational ground-borne noise and vibration impacts identified in Table 1 are summarised in Table 2.

Table 2: Summary of operational ground-borne noise and vibration impacts

	Number of ground-borne sound impacts			
	Low	Medium	High	Very High
Residential properties	0	0	0	0
Non-residential properties	0			0
	Number of ground-borne vibration impacts			
	Minor	Moderate	Major	Risk of building damage
Residential properties	0	0	0	0

Airborne sound: direct impacts and effects

4.3.4 The direct effects from the operation of the Proposed Scheme as well as any new, amended or altered roads or railway lines, which are identified as part of the scheme, are presented in Table 3.

4.3.5 The assessment information, impact criteria and significance criteria for the assessment of the incorporated mitigation case at residential and non-residential receptors are presented in Table 3. The results should be considered in conjunction with the information contained in map series Sv-02 in the CFA10 Volume 5 sound, noise and vibration map book.

4.3.6 Explanation of the Table 3 information is provided in Volume 5: Appendix SV001-000, with the following additional notes.

Where the significant effect column is marked, then a significant effect is identified at the referenced group of dwellings, or individual residential or non-residential receptor.

Yellow denotes a minor impact at a residential building – a change is of 3-5 dB

Orange denotes a moderate impact at a residential building – a change is of 5-10 dB

Red denotes a major impact at a residential building – a change is of >10 dB

* Day - $L_{pAeq,07:00-23:00}$

** Night - $L_{pAeq,23:00-07:00}$

*** Max - L_{pAFmax} In the Proposed Scheme only column, two values are presented. The first is the value for the HS2 mitigated train and the second is the value for the TSI compliant train. For further information refer to Volume 5: Appendix SV-001-000.

**** Where the Proposed Scheme modifies an existing source, i.e. road or railway realignments, the *Proposed Scheme only* level in the table includes the sound from the modified source. In this situation the *Do something (Opening year baseline + Year 15 traffic)* level has been corrected so as to not double count the sound associated with the road or railway on its new and existing alignment.

A Adverse effect

B For non-residential receptors further detail about the type of effect is set out in the text of Appendix SV-001-000.

CD Committed Development. The value in brackets in the number of impacts represented column is the value with the committed development.

G	(G1)Theatres, large auditoria and concert halls, (G2) Sound recording and broadcast studios, (G3) Places of meeting for religious worship, courts, cinemas, lecture theatres, museums and small auditoria or halls, (G4) Schools, colleges, hospitals, hotels and libraries, and (G5) Offices and general commercial premises
H	High existing ambient sound level. Defined as >65dB$L_{Aeq,\ day}$ and/or >55dB$L_{Aeq,\ night}$
L	Low existing ambient sound level. Defined as <42dB$L_{Aeq,\ day}$ and/or <32dB$L_{Aeq,\ night}$
LD	Landscape receptor
NA	Generally no adverse effect
NI	The receptor is predicted to qualify for mitigation, which shall be provided to the specification defined in the Noise Insulation (Railways and other Guided Rail Systems) Regulations 1996
R	Residential
RM	Residential mooring
S	Significant adverse effect
U	Unacceptable adverse effect
#	A change of 3dB or greater has been identified however, the assessment methodology only defines an impact where the absolute sound level from the Proposed Scheme is greater or equal to 50 dB $L_{pAeq,\ 23:00-07:00}$ during the daytime or 40 dB $L_{pAeq,\ 07:00-23:00}$ at night. At the receptor denoted the absolute level condition is not met and therefore no impact is identified.
~	The forecast adverse effects are not considered to be significant on a community basis (further information on methodology is provided in Volume 5: Appendix SV-001-000).
$	A change of 3dB or greater has been identified however, the impact methodology for non-residential receptors includes a screening criteria for G3 building use of 50 dB $L_{pAeq,07:00-23:00,}$ for G4 building use 55 dB $L_{pAeq,07:00-23:00}$ and 45 dB $L_{pAeq,23:00-07:00}$, for G5 building use 55 dB $L_{pAeq,07:00-23:00}$. At the receptor denoted the screening criteria is not met and therefore no impact is identified. Further information is provided in Volume 5: Appendix SV-001-000.
^	The impact methodology has either identified an impact at a receptor which based upon further qualitative information does not gives rise to a significant effect. Further information is provided at the end of this Appendix.

Table 3: Operational airborne sound level, noise impacts and effects

Assessment Location		Impact criteria										Significance criteria								
ID	Area represented	Proposed Scheme only (Year 15 traffic)			Do nothing (Opening year baseline)			Do something (Opening year baseline + Year 15 traffic) ****		Change		Type of effect	Number of impacts represented	Type of receptor	Receptor design	Existing environment	Unique feature	Combined impact	Mitigation of effect	Significant effect
		Day *	Night **	Max ***	Day *	Night **	Max ***	Day *	Night **	Day *	Night **									
312373	North Lee Lane, Terrick	51	43	59/62	49	48	51	52	49	3	1	A	1	R	T	-	-	-	-	~
312509	Nash Lee Road, Terrick	48	39	63/66	56	45	53	56	46	1	1	NA	5	R	T	-	-	-	-	
313082	North Lee Lane, Terrick	50	43	58/61	49	48	51	52	49	3	1	A	5	R	T	-	-	-	-	~
313100	North Lee Lane, Terrick	50	43	56/60	49	48	51	52	49	3	1	A	1	R	T	-	-	-	-	~
313140	North Lee Lane, Terrick	49	39	60/63	46	39	51	51	42	5	3	NA	1	R	T	-	-	-	-	#
313291	North Lee Lane, Terrick	49	40	59/62	49	48	51	52	48	3	1	A	4	R	T	-	-	-	-	#
313337	Risborough Road, Stoke Mandeville	51	42	61/64	54	45	53	55	47	2	2	A	8	R	T	-	-	-	-	
314444	Nash Lee Road, Terrick	48	39	61/64	56	45	53	56	46	1	1	NA	13	R	T	-	-	-	-	
314625	Nash Lee Farm, Nash Lee	52	43	65/68	56	45	53	57	47	2	2	A	6	R	T	-	-	-	-	
314652	Nash Lee Road, Terrick	59	50	65/70	57	46	53	61	51	4	5	A	1	R	T	-	-	-	-	OSV10-C04
314668	Nash Lee Road, Terrick	58	50	65/68	57	46	53	58	50	1	3	A	1	R	T	-	-	-	-	OSV10-C04
314704	Nash Lee Road, Terrick	60	51	67/70	57	46	53	61	51	4	5	A	4	R	T	-	-	-	-	OSV10-C04
314865	Wendover Road, Stoke Mandeville	49	41	61/64	54	47	52	55	48	1	1	A	1	R	T	-	-	-	-	
350579	London Road, Wendover	45	35	62/65	57	52	90	58	52	0	0	NA	2	R	T	-	-	-	-	
350695	Cobblers Hill, Wendover	43	34	58/61	51	45	55	51	45	1	0	NA	2	R	T	-	-	-	-	
350753	London Road, Wendover	51	41	66/69	66	60	83	66	60	0	0	A	3	R	T	H	-	-	-	
350796	London Road, Wendover	46	37	61/64	52	49	57	53	49	1	0	NA	2	R	T	-	-	-	-	

Assessment Location		Impact criteria										Significance criteria								
ID	Area represented	Proposed Scheme only (Year 15 traffic)			Do nothing (Opening year baseline)			Do something (Opening year baseline + Year 15 traffic) ****		Change		Type of effect	Number of impacts represented	Type of receptor	Receptor design	Existing environment	Unique feature	Combined impact	Mitigation of effect	Significant effect
		Day *	Night **	Max ***	Day *	Night **	Max ***	Day *	Night **	Day *	Night **									
350868	London Road, Wendover	50	41	64/67	74	69	83	74	69	0	0	A	1	R	T	H	-	-	-	
350945	Wendover Dean, Aylesbury	48	39	63/66	63	58	83	63	58	0	0	NA	1	R	T	H	-	-	-	
351596	Aylesbury Road, Great Missenden	42	33	58/61	63	57	90	63	57	0	0	NA	9	R	T	H	-	-	-	
351644	Aylesbury Road, Great Missenden	43	34	58/61	69	63	90	69	63	0	0	NA	2	R	T	H	-	-	-	
351671	London Road, Wendover	47	38	64/67	66	60	90	66	60	0	0	NA	1	R	T	H	-	-	-	
351696	Bowood Lane, Wendover	56	47	67/70	51	45	55	57	49	6	4	A	4	R	T	-	-	-	-	OSV10-C01
351710	Wendover Dean, Aylesbury	58	48	69/72	51	45	55	59	50	8	5	A	1	R	T	-	-	-	-	OSV10-C01
351740	Wendover Dean, Aylesbury	56	46	70/73	51	45	55	57	49	6	4	A	1	R	T	-	-	-	-	OSV10-C01
351792	Bowood Lane, Wendover	56	47	67/70	52	49	57	58	51	5	2	A	3	R	T	-	-	-	-	OSV10-C01
351934	Kings Lane, Wendover	49	39	61/64	52	49	57	54	49	1	0	NA	1	R	T	-	-	-	-	
355409	Hunts Green, The Lee	42	33	55/58	54	53	68	54	53	0	0	NA	1	R	T	-	-	-	-	
355417	Hunts Green, The Lee	43	34	56/59	54	53	68	54	53	0	0	NA	1	R	T	-	-	-	-	
355448	Hunts Green, The Lee	40	31	52/55	46	39	51	47	40	1	1	NA	6	R	T	-	-	-	-	
355498	The Lee, Great Missenden	35	26	45/48	46	39	51	46	39	0	0	NA	5	R	T	-	-	-	-	
355734	Nash Lee Lane, Wendover	50	41	62/65	54	46	52	55	47	1	1	A	7	R	T	-	-	-	-	
356230	Aylesbury Road, Wendover	35	26	55/58	53	44	55	53	44	0	0	NA	82	R	T	-	-	-	-	
356878	Small Dean Lane, Wendover	49	40	65/68	49	37	51	52	41	3	5	A	3	R	T	-	-	-	-	~
356932	London Road, Wendover	58	49	76/79	74	69	83	74	69	0	0	A	1	R	T	H	-	-	-	
357093	Bacombe Lane, Wendover	47	38	65/68	48	41	47	51	43	3	2	NA	5	R	T	-	-	-	-	#

Assessment Location		Impact criteria										Significance criteria								
ID	Area represented	Proposed Scheme only (Year 15 traffic)			Do nothing (Opening year baseline)			Do something (Opening year baseline + Year 15 traffic) ****		Change		Type of effect	Number of impacts represented	Type of receptor	Receptor design	Existing environment	Unique feature	Combined impact	Mitigation of effect	Significant effect
		Day *	Night **	Max ***	Day *	Night **	Max ***	Day *	Night **	Day *	Night **									
357199	Nash Lee Lane, Wendover	60	52	72/75	51	46	58	60	52	9	6	A	7	R	T	-	-	-	-	OSV10-C04
357521	Ellesborough Road, Wendover	35	27	49/52	51	44	75	51	44	0	0	NA	5	R	T	-	-	-	-	
357547	Ellesborough Road, Wendover	36	28	51/54	54	47	75	54	47	0	0	NA	5	R	T	-	-	-	-	
357601	Ellesborough Road, Wendover	36	28	53/56	60	53	75	60	53	0	0	NA	5	R	T	-	-	-	-	
357663	Ellesborough Road, Wendover	45	36	55/58	49	43	53	50	43	1	0	NA	1	R	T	-	-	-	-	
357730	Ellesborough Road, Wendover	45	36	55/58	49	43	53	50	44	1	1	NA	4	R	T	-	-	-	-	
357877	Nash Lee End, Wendover	43	35	56/59	54	46	53	55	46	0	0	NA	1	R	T	-	-	-	-	
357971	Nash Lee Lane, Wendover	55	47	66/69	56	51	60	58	51	2	1	A	6	R	T	-	-	-	-	
358410	Wendover Road, Stoke Mandeville	45	36	58/61	54	47	52	54	48	0	0	NA	2	R	T	-	-	-	-	
358677	Wendover Road, Stoke Mandeville	46	37	58/61	54	47	52	54	48	1	0	NA	3	R	T	-	-	-	-	
358776	Nash Lee End, Wendover	41	33	53/56	54	47	52	54	47	0	0	NA	1	R	T	-	-	-	-	
358870	Little London, Wendover	45	35	61/64	49	37	51	50	39	1	2	NA	3	R	T	-	-	-	-	
359140	Small Dean Lane, Wendover	51	42	65/68	49	37	51	53	43	4	6	A	2	R	T	-	-	-	-	~
359159	Small Dean Lane, Wendover	53	43	66/69	49	37	51	54	44	5	7	A	2	R	T	-	-	-	-	~
359175	Bacombe Lane, Wendover	44	35	63/66	48	41	47	49	42	2	1	NA	1	R	T	-	-	-	-	
359188	Bacombe Lane, Wendover	41	32	57/60	48	41	47	49	41	1	1	NA	2	R	T	-	-	-	-	
359264	London Road, Wendover	61	51	75/79	49	42	49	61	52	12	10	A	2	R	T	-	-	-	-	~
359341	Bacombe Lane, Wendover	50	40	69/72	49	47	51	53	48	3	1	A	6	R	T	-	-	-	-	OSV10-C03
359368	Bacombe Lane, Wendover	52	43	73/76	49	47	51	54	48	5	1	A	1	R	T	-	-	-	-	OSV10-C03

Assessment Location		Impact criteria										Significance criteria								
ID	Area represented	Proposed Scheme only (Year 15 traffic)			Do nothing (Opening year baseline)			Do something (Opening year baseline + Year 15 traffic) ****		Change		Type of effect	Number of impacts represented	Type of receptor	Receptor design	Existing environment	Unique feature	Combined impact	Mitigation of effect	Significant effect
		Day *	Night **	Max ***	Day *	Night **	Max ***	Day *	Night **	Day *	Night **									
359406	Bacombe Lane, Wendover	62	53	83/86	52	45	41	63	54	10	9	S	3	R	T	-	-	-	NI	OSV10-C03 OSV10-D01
359465	Ellesborough Road, Wendover	35	25	51/54	52	46	55	52	46	0	0	NA	4	R	T	-	-	-	-	
359523	Ellesborough Road, Wendover	39	30	59/62	50	43	54	50	43	0	0	NA	3	R	T	-	-	-	-	
359570	Ellesborough Road, Wendover	39	30	63/66	58	52	60	58	52	0	0	NA	6	R	T	-	-	-	-	
359628	Ellesborough Road, Wendover	49	39	61/64	58	52	60	58	52	0	0	A	8	R	T	-	-	-	-	
359821	Forest Close, Wendover	41	34	58/61	62	51	59	62	51	0	0	NA	41	R	T	-	-	-	-	
359991	Coombe Avenue, Wendover	40	32	55/58	62	51	59	62	51	0	0	NA	20	R	T	-	-	-	-	
360117	Thornton Crescent, Wendover	37	28	58/61	53	44	55	53	44	0	0	NA	31	R	T	-	-	-	-	
360282	Witchell, Wendover	43	33	64/67	52	49	56	52	50	1	0	NA	32	R	T	-	-	-	-	
360527	High Street, Wendover	39	30	61/64	52	49	56	52	49	0	0	NA	34	R	T	-	-	-	-	
361026	Dobbins Lane, Wendover	39	31	60/63	53	44	55	53	44	0	0	NA	69	R	T	-	-	-	-	
361089	Vinetrees, Wendover	33	24	51/54	53	44	55	53	44	0	0	NA	59	R	T	-	-	-	-	
361283	Tring Road, Wendover	38	29	58/61	53	44	55	53	44	0	0	NA	32	R	T	-	-	-	-	
361353	Little Hampden Close, Wendover	43	34	67/70	62	51	59	62	51	0	0	NA	62	R	T	-	-	-	-	
361567	South Street, Wendover	50	41	70/73	52	49	56	54	50	2	1	A	4	R	T	-	-	-	-	
361934	Dobbins Lane, Wendover	37	29	55/58	53	44	55	53	44	0	0	NA	14	R	T	-	-	-	-	
362092	Dobbins Lane, Wendover	38	29	55/58	53	44	55	53	44	0	0	NA	28	R	T	-	-	-	-	
362169	Chiltern Road, Wendover	35	25	52/55	53	44	55	53	44	0	0	NA	59	R	T	-	-	-	-	
362513	Dobbins Lane, Wendover	41	32	58/61	53	44	55	53	44	0	0	NA	22	R	T	-	-	-	-	

Assessment Location		Impact criteria										Significance criteria								
ID	Area represented	Proposed Scheme only (Year 15 traffic)			Do nothing (Opening year baseline)			Do something (Opening year baseline + Year 15 traffic) ****		Change		Type of effect	Number of impacts represented	Type of receptor	Receptor design	Existing environment	Unique feature	Combined impact	Mitigation of effect	Significant effect
		Day *	Night **	Max ***	Day *	Night **	Max ***	Day *	Night **	Day *	Night **									
362638	Thornton Crescent, Wendover	42	33	62/65	59	53	63	59	53	0	0	NA	49	R	T	-	-	-	-	
362785	Bridleways, Wendover	47	38	64/67	50	45	53	52	45	2	1	NA	22	R	T	-	-	-	-	
362860	Dobbins Lane, Wendover	40	31	58/61	53	44	55	53	44	0	0	NA	83	R	T	-	-	-	-	
363376	Nightingale Road, Wendover	37	27	53/56	53	44	55	53	44	0	0	NA	103	R	T	-	-	-	-	
363661	Dobbins Lane, Wendover	43	34	60/63	50	41	48	50	41	1	1	NA	19	R	T	-	-	-	-	
364087	Orchard Close, Wendover	38	29	54/57	50	41	48	50	41	0	0	NA	37	R	T	-	-	-	-	
364294	The Cedars, Wendover	40	31	56/59	50	41	48	50	41	0	0	NA	53	R	T	-	-	-	-	
364751	Haglis Drive, Wendover	36	27	52/55	50	41	48	50	41	0	0	NA	64	R	T	-	-	-	-	
365001	Lionel Avenue, Wendover	40	30	55/58	46	45	51	47	45	1	0	NA	24	R	T	-	-	-	-	
365130	Aylesbury Road, Wendover	37	28	51/54	50	43	75	50	43	0	0	NA	15	R	T	-	-	-	-	
365216	Aylesbury Road, Wendover	37	29	51/54	50	43	75	50	43	0	0	NA	10	R	T	-	-	-	-	
365280	Aylesbury Road, Wendover	41	32	56/59	46	45	51	47	45	1	0	NA	1	R	T	-	-	-	-	
365348	Aylesbury Road, Wendover	36	27	50/53	66	59	75	66	59	0	0	NA	37	R	T	H	-	-	-	
365756	Bryants Acre, Wendover	34	25	50/53	66	59	75	66	59	0	0	NA	48	R	T	H	-	-	-	
366563	Lionel Avenue, Wendover	38	29	53/56	46	45	51	47	45	1	0	NA	38	R	T	-	-	-	-	
366705	Lionel Avenue, Wendover	43	34	59/62	46	45	51	48	45	2	0	NA	32	R	T	-	-	-	-	
366745	Aylesbury Road, Wendover	33	24	52/55	53	44	55	53	44	0	0	NA	19	R	T	-	-	-	-	
366911	Liffre Drive, Wendover	34	25	49/52	63	56	75	63	56	0	0	NA	43	R	T	H	-	-	-	
367404	Aylesbury Road, Wendover	39	30	53/56	51	43	75	51	43	0	0	NA	2	R	T	-	-	-	-	
368607	London Road, Wendover	55	45	72/75	74	69	83	74	69	0	0	A	7	R	T	H	-	-	-	

Assessment Location		Impact criteria										Significance criteria								
ID	Area represented	Proposed Scheme only (Year 15 traffic)			Do nothing (Opening year baseline)			Do something (Opening year baseline + Year 15 traffic) ****		Change		Type of effect	Number of impacts represented	Type of receptor	Receptor design	Existing environment	Unique feature	Combined impact	Mitigation of effect	Significant effect
		Day *	Night **	Max ***	Day *	Night **	Max ***	Day *	Night **	Day *	Night **									
368658	London Road, Wendover	52	43	69/72	74	69	83	74	69	0	0	A	7	R	T	H	-	-	-	
368776	Rocky Lane, Wendover	53	45	67/70	54	46	54	56	48	3	2	A	6	R	T	-	-	-	-	OSV10-C02
368781	Rocky Lane, Wendover	59	50	77/80	54	47	54	60	51	5	4	A	1	R	T	-	-	-	-	OSV10-C02
368819	London Road, Wendover	51	42	67/70	74	69	83	74	69	0	0	A	4	R	T	H	-	-	-	
368834	Rocky Lane, Wendover	63	54	78/82	50	41	48	63	54	13	13	S	1	R	T	-	-	-	NI	OSV10-C02 OSV10-D02
368919	London Road, Wendover	55	46	69/72	45	35	47	56	46	11	12	A	3	R	T	-	-	-	-	~
369011	Hale Lane, Wendover	47	38	60/63	47	39	46	50	41	3	3	NA	4	R	T	-	-	-	-	#
369123	Hale Lane, Wendover	45	36	60/63	47	39	46	49	40	2	2	NA	5	R	T	-	-	-	-	
369288	Hale Road, Wendover	48	39	61/65	47	39	46	51	42	3	3	NA	11	R	T	-	-	-	-	#
369370	Hale Road, Wendover	47	38	61/65	47	39	46	50	41	3	3	NA	12	R	T	-	-	-	-	#
369461	Heron Path, Wendover	46	37	67/70	52	49	56	53	50	1	0	NA	7	R	T	-	-	-	-	
369725	Honey Banks, Wendover	39	30	61/64	52	49	56	52	49	0	0	NA	38	R	T	-	-	-	-	
369820	Hale Road, Wendover	39	30	59/62	52	49	56	52	49	0	0	NA	1	R	T	-	-	-	-	
369935	Hale Road, Wendover	42	33	62/65	47	39	46	48	40	1	1	NA	7	R	T	-	-	-	-	
370028	Hazeldene, Wendover	43	34	64/67	52	49	56	52	50	1	0	NA	8	R	T	-	-	-	-	
370197	Church Lane, Wendover	53	43	66/71	55	49	56	55	50	0	1	A	4	R	T	-	-	-	-	
370218	Hale Road, Wendover	51	42	64/68	47	39	46	53	44	6	5	A	3	R	T	-	-	-	-	~
370600	Hampden Road, Wendover	35	26	55/58	52	49	56	52	49	0	0	NA	65	R	T	-	-	-	-	
371603	The Poplars, Wendover	37	27	57/60	53	44	55	53	44	0	0	NA	136	R	T	-	-	-	-	
371673	Jusons Glebe, Wendover	36	27	56/59	53	44	55	53	44	0	0	NA	32	R	T	-	-	-	-	

Assessment Location		Impact criteria										Significance criteria								
ID	Area represented	Proposed Scheme only (Year 15 traffic)			Do nothing (Opening year baseline)			Do something (Opening year baseline + Year 15 traffic) ****		Change		Type of effect	Number of impacts represented	Type of receptor	Receptor design	Existing environment	Unique feature	Combined impact	Mitigation of effect	Significant effect
		Day *	Night **	Max ***	Day *	Night **	Max ***	Day *	Night **	Day *	Night **									
372731	Rocky Lane, Wendover	52	43	66/69	48	46	51	54	48	5	2	A	1	R	T	-	-	-	-	OSV10-C02
372742	Rocky Lane, Wendover	55	46	71/74	50	44	52	56	48	7	4	A	1	R	T	-	-	-	-	OSV10-C02
372781	Rocky Lane, Wendover	56	46	69/72	50	44	52	56	48	7	4	A	2	R	T	-	-	-	-	OSV10-C02
372817	Rocky Lane, Wendover	61	52	75/78	48	46	51	61	53	13	6	A	1	R	T	-	-	-	-	OSV10-C02
372897	Kings Ash, Great Missenden	48	38	60/63	53	42	53	54	44	1	1	NA	2	R	T	-	-	-	-	
372916	Kings Ash, Great Missenden	47	38	64/67	53	42	53	54	44	1	1	NA	2	R	T	-	-	-	-	
372950	Chesham Lane, The Lee	46	36	60/63	53	42	53	54	43	1	1	NA	2	R	T	-	-	-	-	
372983	Kings Ash, Great Missenden	43	34	58/61	53	42	53	54	43	0	1	NA	5	R	T	-	-	-	-	
373067	Kings Ash, Great Missenden	46	36	62/65	53	42	53	54	43	1	1	NA	1	R	T	-	-	-	-	
373102	Kings Ash, Great Missenden	47	38	60/63	47	46	51	50	46	3	1	NA	1	R	T	-	-	-	-	#
373141	London Road, Wendover	54	45	68/71	45	35	47	54	45	9	10	A	1	R	T	-	-	-	-	~
700305	Rocky Lane, Wendover	56	46	70/73	50	44	52	57	48	7	4	A	1	R	T	-	-	-	-	OSV10-C02
700307	Kings Ash, Great Missenden	49	39	61/64	47	46	51	51	46	4	1	NA	1	R	T	-	-	-	-	#
700312	Hale Road, Wendover	51	42	64/68	47	39	46	53	44	6	5	A	1	R	T	-	-	-	-	~
700313	Heron Path, Wendover	48	39	68/71	52	49	56	53	50	2	0	NA	1	R	T	-	-	-	-	
700315	South Street, Wendover	48	39	71/74	62	51	59	62	51	0	0	NA	2	R	T	-	-	-	-	
700323	Ellesborough Road, Wendover	41	32	63/66	50	43	54	50	43	1	0	NA	1	R	T	-	-	-	-	
700324	Ellesborough Road, Wendover	38	29	55/58	50	43	54	50	43	0	0	NA	1	R	T	-	-	-	-	
700326	Forest Close, Wendover	40	33	55/58	62	51	59	62	51	0	0	NA	2	R	T	-	-	-	-	
700327	Bridleways, Wendover	47	38	64/67	50	45	53	52	45	2	1	NA	1	R	T	-	-	-	-	

Assessment Location		Impact criteria										Significance criteria								
ID	Area represented	Proposed Scheme only (Year 15 traffic)			Do nothing (Opening year baseline)			Do something (Opening year baseline + Year 15 traffic) ****		Change		Type of effect	Number of impacts represented	Type of receptor	Receptor design	Existing environment	Unique feature	Combined impact	Mitigation of effect	Significant effect
		Day *	Night **	Max ***	Day *	Night **	Max ***	Day *	Night **	Day *	Night **									
700328	Ellesborough Road, Wendover	38	30	55/58	52	46	55	53	46	0	0	NA	2	R	T	-	-	-	-	
901001	Chiltern Scarpe - Sam	26	17	41/44	42	37	41	42	37	0	0	A	-	LD	-	L	-	-	-	
901002	Longwick Vale - 100m	57	48	69/72	52	42	53	58	49	6	7	A	-	LD	-	-	-	-	-	
901003	Longwick Vale - 250m	49	40	61/64	49	43	53	52	45	3	2	A	-	LD	-	-	-	-	-	
901004	Longwick Vale - 500m	47	37	58/61	49	43	53	51	44	2	1	A	-	LD	-	-	-	-	-	
901017	HV - Aylesbury (1km)	17	10	28/31	49	43	53	49	43	0	0	A	-	LD	-	-	-	-	-	
350753	Bowood Lane, Wendover, (Engineering Works)	51	41	66/69	66	60	83	66	60	0	0	B	1	G5	T	H	-	-	-	
356230	Wendover Health Centre, Aylesbury Road (Health Centre)	35	26	55/58	53	44	55	53	44	0	0	B	1	G4	T	-	-	-	-	
357950	Nash Lee End, Wendover (Shopping)	49	40	59/62	56	51	60	57	51	1	0	B	1	G5	T	-	-	-	-	
358776	Aylesbury Road, Wendover (General Commercial)	41	33	53/56	54	47	52	54	47	0	0	B	1	G5	T	-	-	-	-	
359821	Pound Street, Wendover (General Commercial)	41	34	58/61	62	51	59	62	51	0	0	B	2	G5	T	-	-	-	-	
359821	Abbeyfield House, Dobbins Lane (Office)	41	34	58/61	62	51	59	62	51	0	0	B	2	G5	T	-	-	-	-	
360117	Station Approach, Wendover (General Commercial)	37	28	58/61	53	44	55	53	44	0	0	B	5	G5	T	-	-	-	-	
360117	The Military Gallery, Station Approach (Art Gallery)	37	28	58/61	53	44	55	53	44	0	0	B	1	G5	T	-	-	-	-	

Assessment Location		Impact criteria										Significance criteria								
ID	Area represented	Proposed Scheme only (Year 15 traffic)			Do nothing (Opening year baseline)			Do something (Opening year baseline + Year 15 traffic) ****		Change		Type of effect	Number of impacts represented	Type of receptor	Receptor design	Existing environment	Unique feature	Combined impact	Mitigation of effect	Significant effect
		Day *	Night **	Max ***	Day *	Night **	Max ***	Day *	Night **	Day *	Night **									
360282	High Street, Wendover (General Commercial)	43	33	64/67	52	49	56	52	50	1	0	B	12	G5	T	-	-	-	-	
360527	High Street, Wendover (General Commercial)	39	30	61/64	52	49	56	52	49	0	0	B	9	G5	T	-	-	-	-	
360527	Wendy Lewis Studio & Gallery, Wendover (Art Gallery)	39	30	61/64	52	49	56	52	49	0	0	B	3	G5	T	-	-	-	-	
360527	Woollerton House, High Street (General Commercial)	39	30	61/64	52	49	56	52	49	0	0	B	1	G5	T	-	-	-	-	
361026	High Street, Wendover (General Commercial)	39	31	60/63	53	44	55	53	44	0	0	B	7	G5	T	-	-	-	-	
361089	High Street, Wendover (General Commercial)	33	24	51/54	53	44	55	53	44	0	0	B	10	G5	T	-	-	-	-	
361283	The Tanyard, Tring Road, Wendover (Shopping)	38	29	58/61	53	44	55	53	44	0	0	B	2	G5	T	-	-	-	-	
361283	Holly Court, Tring Road, Wendover (General Commercial)	38	29	58/61	53	44	55	53	44	0	0	B	2	G5	T	-	-	-	-	
361283	Aylesbury Road, Wendover (General Commercial)	38	29	58/61	53	44	55	53	44	0	0	B	4	G5	T	-	-	-	-	
361283	Tring Road, Wendover (General Commercial)	38	29	58/61	53	44	55	53	44	0	0	B	1	G5	T	-	-	-	-	
361934	Dobbins Lane, Wendover (Club)	37	29	55/58	53	44	55	53	44	0	0	B	1	G5	T	-	-	-	-	
362513	Dobbins Lane, Wendover	41	32	58/61	53	44	55	53	44	0	0	B	2	G5	T	-	-	-	-	

Assessment Location		Impact criteria										Significance criteria								
ID	Area represented	Proposed Scheme only (Year 15 traffic)			Do nothing (Opening year baseline)			Do something (Opening year baseline + Year 15 traffic) ****		Change		Type of effect	Number of impacts represented	Type of receptor	Receptor design	Existing environment	Unique feature	Combined impact	Mitigation of effect	Significant effect
		Day *	Night **	Max ***	Day *	Night **	Max ***	Day *	Night **	Day *	Night **									
	(General Commercial)																			
362638	Station Approach, Wendover (General Commercial)	42	33	62/65	59	53	63	59	53	0	0	B	4	G5	T	-	-	-	-	
363376	Chiltern Road, Wendover (British Legion Club)	37	27	53/56	53	44	55	53	44	0	0	B	1	G5	T	-	-	-	-	
365348	Complementary Health Clinic, Castle Park Road (Clinic)	36	27	50/53	66	59	75	66	59	0	0	B	1	G4	T	H	-	-	-	
365756	Knights Court, Aylesbury Road, Wendover, (Shopping)	34	25	50/53	66	59	75	66	59	0	0	B	1	G5	T	H	-	-	-	
366563	Aylesbury Road, Wendover (Police Station)	38	29	53/56	46	45	51	47	45	1	0	B	1	G4	T	-	-	-	-	
366745	Wendover Free Church (Church)	33	24	52/55	53	44	55	53	44	0	0	B	2	G3	T	-	-	-	-	
366745	Hall, Aylesbury Road, Wendover (Hall)	33	24	52/55	53	44	55	53	44	0	0	B	1	G3	T	-	-	-	-	
367404	Aylesbury Road, Wendover (General Commercial)	39	30	53/56	51	43	75	51	43	0	0	B	1	G5	T	-	-	-	-	
368702	London Road, Wendover, (General Commercial)	49	40	68/71	74	69	83	74	69	0	0	B	1	G5	T	H	-	-	-	
369123	Boddington Cottage, Hale Lane (General Commercial)	45	36	60/63	47	39	46	49	40	2	2	B	1	G5	T	-	-	-	-	
369223	St Mary's Church (Church)	51	42	65/70	55	49	56	54	50	-1	1	B	1	G3	T	-	-	-	-	OSV10-N01
369461	Hale Road, Wendover, (General Commercial)	46	37	67/70	52	49	56	53	50	1	0	B	1	G5	T	-	-	-	-	

Assessment Location		Impact criteria									Significance criteria								
ID	Area represented	Proposed Scheme only (Year 15 traffic)			Do nothing (Opening year baseline)			Do something (Opening year baseline + Year 15 traffic) ****		Change		Type of effect	Number of impacts represented	Type of receptor	Receptor design	Existing environment	Unique feature	Combined impact	Mitigation of effect	Significant effect
		Day *	Night **	Max ***	Day *	Night **	Max ***	Day *	Night **	Day *	Night **									
370197	Chiltern Way Federation, Church Lane, Wendover, (School)	53	43	66/71	55	49	56	55	50	0	1	B	1	G4	T	-	-	-	-	
371603	Scout Hall, Clay Lane, Wendover (Hall)	37	27	57/60	53	44	55	53	44	0	0	B	1	G3	T	-	-	-	-	
700312	Knights Court, Hale Road (General Commercial)	51	42	64/68	47	39	46	53	44	6	5	B	2	G5	T	-	-	-	-	$

Direct impact - Summary

4.3.7 The operational airborne noise impacts identified in Table 3 are summarised in Table 4.

Table 4: Summary of operational airborne sound impacts

Receptor	Number of impacts		
	Minor	Moderate	Major
Residential properties	19	41	10
Non-residential properties	1	0	0
Quiet areas	None	None	None

4.4 Assessment of impacts and effects

Residential receptors: direct effects - individual buildings

4.4.2 Taking account of the avoidance and mitigation measures incorporated into the Proposed Scheme, the assessment has identified one residential building close to the Proposed Scheme, Hartley Farm, Rocky Lane, receptor reference 368834 (marked as OSV10-D02 in Table 3) where noise would exceed the daytime trigger threshold set in the Regulations. It is therefore estimated that this building is likely to qualify for noise insulation under the Regulations. It is indicated on Volume 5: Map Book - Sound, noise and vibration, Map series SV-02.

4.4.3 The assessment has identified a number of additional residential buildings close to the Proposed Scheme where the daytime forecast noise level does not exceed the threshold set in the Regulations but the forecast night-time noise level would exceed the World Health Organization's Interim Target of 55dB[2], or the maximum noise level (dependent on the number of train passes) as a train passes exceeds the criterion[3]. It is estimated that these buildings will also be offered noise insulation as described in the Avoidance and mitigation measures section of Volume 2: Report 10. These buildings are indicated on Volume 5: Map Book - Sound, noise and vibration, Map series SV-02, represented by receptor reference 359406 and marked as OSV10-D01 in Table 3:

- Larkfield, Bacombe Lane, Wendover;
- Long Meadow, Bacombe Lane, Wendover; and
- Cobwebs, Bacombe Lane, Wendover.

[2] World Health Organization, Night-time Noise Guidelines for Europe, 2010

[3] During the night (2300-0700) a significant effect is also identified where the Proposed Scheme results in a maximum sound level at the façade of a building at or above: 85 dB L_{pAFmax} (where the number of train pass-bys exceeding this value is less than or equal to 20); or 80 dB L_{pAFmax} (where the number of train pass-bys exceeding this value is greater than 20).

4.4.4 These properties are also identified as being likely to qualify for noise insulation as a consequence of construction noise as described earlier in this section.

Residential receptors: direct effects –communities

4.4.5 The mitigation measures in this area will avoid airborne noise adverse effects on the majority of receptors, and at the following communities:

- Hunt's Green;
- Wendover Dean (except as identified in Table 5);
- Kingsash;
- Wendover (except as identified in Table 5); and
- Nash Lee (except as identified in Table 5).

4.4.6 Taking account of the envisaged mitigation, Map Series SV-02 (Volume 5 Map book) shows the long term 40dB[4] night-time sound level contour from the operation of trains on the Proposed Scheme. The extent of the 40dB night-time sound level contour is equivalent to, or slightly larger than, the 50dB daytime contour[5]. In general, below these levels adverse effects are not expected.

4.4.7 Above 40dB during the night and 50dB during the day the effect of noise is dependent on the baseline sound levels in that area and the change in sound level (magnitude of effect) brought about by the Proposed Scheme. The airborne noise impacts and effects forecast for the operation of the scheme are presented on Map Series SV-02 (Volume 5 Map Book).

4.4.8 Approximately 25 isolated properties within the area have been identified as being subject to an observed adverse noise effect these effects are likely to be considered as an effect on the acoustic character of the area such that there is a perceived change in the quality of life. However, as the affected properties are spatially remote from larger defined residential areas, are subject to smaller magnitudes of noise effect, or are small in number, the effects are not considered to be significant.

4.4.9 The changes in noise levels are likely to affect the acoustic character of the area such that there is a perceived change in the quality of life and are considered to be significant when assessed on a community basis[6] taking account of the local context[7] as identified in Table 5.

[4] Defined as the equivalent continuous sound level from 23:00 to 07:00 or $L_{pAeq,night}$)

[5] With the train flows described in the assumptions section of this CFA Report, the daytime sound level (defined as the equivalent continuous sound level from 07:00 to 23:00 or $_{LpAeq,day}$) from the Proposed Scheme would be approximately 10dB higher than the night-time sound level. The 40dB contour therefore indicates the distance from the Proposed Scheme at which the daytime sound level would be 50dB.

[6] Further information is contained in Volume 1.

[7] Further information is provided in SV-001-000 and SV-004-010.

Table 5: Direct adverse effects on residential communities and shared open areas that are considered significant on a community basis

Significant effect number (see Map series SV-02 Table 1 and 3)	Source of significant effect	Time of day	Location and details
OSV10-C01	Airborne noise increase from new train services	Daytime and night-time	Wendover Dean south. Approximately 10 dwellings in the vicinity of Bowood Lane and London Road. Forecast increases in sound from the railway are likely to cause a moderate adverse effect on the acoustic character of the area around the properties. There are no shared open spaces identified as being affected in this community area.
OSV10-C02	Airborne noise increase from new train services	Daytime and night-time	Wendover Dean north. Approximately 15 dwellings in the vicinity of Rocky Lane and Chesham Lane. Forecast increases in sound from the railway are likely to cause a major adverse effect on the acoustic character of the area around the very closest properties to the Proposed Scheme reducing to a minor effect at those furthest away. There are no shared open spaces identified as being affected in this community area.
OSV10-C03	Airborne noise increase from new train services	Daytime and night-time	Wendover south. Approximately 10 dwellings in the vicinity of Bacombe Lane. Forecast increases in sound from the railway are likely to cause a major adverse effect on the acoustic character of the area around the three very closest properties to the Proposed Scheme reducing to a minor effect at those furthest away. There are no shared open spaces identified as being affected in this community area.
OSV10-C04	Airborne noise increase from new train services	Daytime and night-time	Nash Lee. Approximately 15 dwellings in the vicinity of Nash Lee Lane. Forecast increases in sound from the railway are likely to cause a moderate adverse effect on the acoustic character of the area around these properties. No shared open spaces have been identified as being affected in this community area.

Residential receptors: indirect effects

4.4.10 The transport assessment presented in Volume 5: Appendix TR-001-000, has been used to identify those roads or railways within this study area where the alignment remains as at present, but a change in flow or composition is identified which is greater than the screening criteria defined in Volume 5: Appendix SV-001-000. No roads or railways which exceed the criteria defined in Volume 5: Appendix SV-001-000 have been identified in this study area.

4.4.11 The assessment of operational noise and vibration indicates that significant indirect effects on residential receptors are unlikely to occur in this area.

Non-residential receptors: direct effects

4.4.12 The assessment has identified airborne noise impact at St. Mary's Church, Wendover represented by receptor reference 369222.

St. Mary's Church, Wendover

4.4.13 An impact has been identified based upon the maximum noise level incident at this receptor. An assessment has been undertaken to determine if this impact would result in a likely significant effect at this non-residential receptor, using the significance criteria detailed in Volume 5: Appendix 001-000.

4.4.14 St. Mary's Church is constructed from flint rubble with interspersed blocks of stone, ashlar stone dressings with some restoration in limestone. The roofs are tiled with the exception of the nave aisles which are lead. Fenestration is a mixture of single glazed and stained glass windows. Ventilation is provided by opening the windows. The church is used for evening concerts which typically commence at 19:30.

4.4.15 The baseline survey has identified that currently the receptor is subject to incident maximum noise levels during performances of 66 - 81dBL$_{Amax}$ and typically during performance times of 59 - 64 dBL$_{PAFmax.}$ The maximum incident levels from the Proposed Scheme are 65 - 70 dBL$_{pAFmax.}$

4.4.16 St. Mary's Church has been identified, on a precautionary basis, as being subject to a significant adverse effect denoted by OSV10-N01 in Table 3 and drawing SV-02 (see CFA10 Volume 5 sound, noise and vibration map book). This may take the form of the activity disturbance to the people during concert performances.

4.4.17 The assessment of adverse effect of noise inside St. Mary's Church is on a worst case basis. It assumes that any activities that are more sensitive to noise take place in the internal areas of the church that have windows doors or other openings (for example on the bell tower) on the façade facing the route, that little sound insulation is provided by the windows, doors or other openings and that there is no disturbance from existing sound sources.

Summary

4.4.18 The assessment of operational noise and vibration indicates that significant effects are likely on the non-residential receptors identified in Table 6.

4.4.19 The assessment of effects on non-residential receptors has been undertaken on a worst case basis taking account of publicly available information about each receptor.

Table 6: Likely significant noise or vibration effects on non-residential receptors arising from operation of the Proposed Scheme

Significant effect number (see Map series SV-02 Table 1 and 3)	**Type of significant effect and source**	**Time of day**	**Location and details**
OSV10-N01	Minor airborne noise effect on the acoustic character around the church and on a worst case basis there is a risk of disturbing activities inside church buildings due to the operation of train services.	Daytime and night-time	St. Mary's Church, Wendover, which is also used for live music performance.

Non-residential receptors: indirect effects

4.4.20 The transport assessment presented in Volume 5: Appendix TR-001-000, has been used to identify those roads or railways within this study area where the alignment remains as at present, but a change in flow or composition is identified which is greater than the screening criteria defined in Volume 5: Appendix SV-001-000. No roads or railways which exceed the criteria defined in Volume 5: Appendix SV-001-000 have been identified in this study area.

4.4.21 The assessment of operational noise and vibration indicates that significant indirect effects are unlikely to occur on non-residential receptors in this area.

Cumulative effects

4.4.22 Details of properties being currently developed which were afforded planning approval before the safeguarding date are presented in Volume 5: Appendix CT004-000. Within this area, the operational sound, noise or vibration associated with these developments in conjunction with the operation of the Proposed Scheme do not result in any significant cumulative effects.